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Distribution of lesions and identification of parasites by immunohistochemistry in cases of acute toxoplasmosis in New World primates and prosimians in captivity in Mexico

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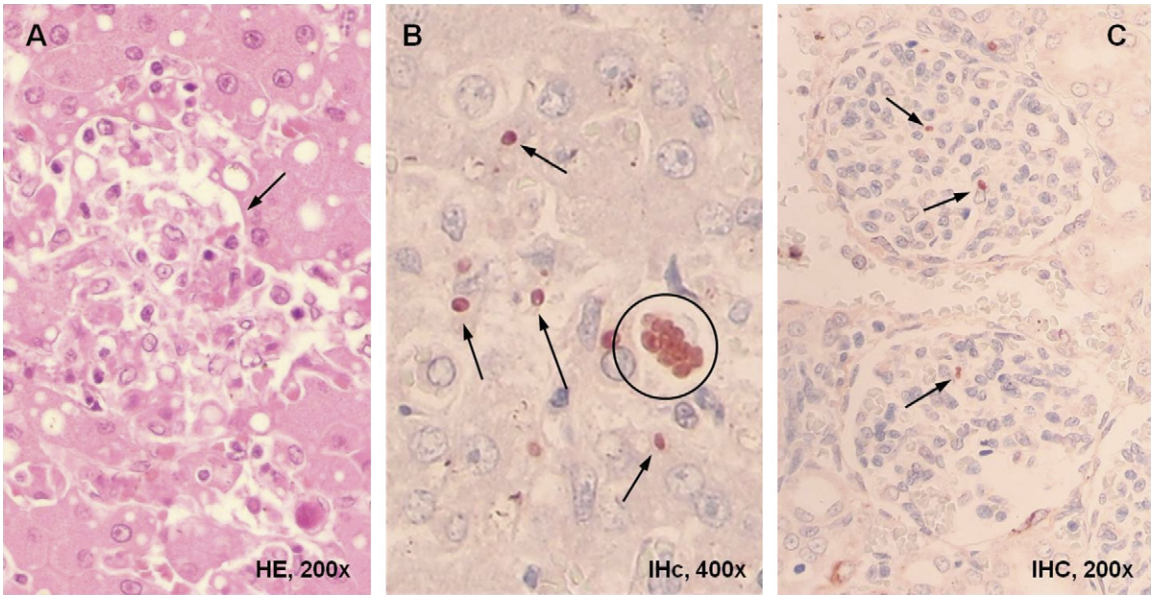
Background: Introduction New World primate species are considered more susceptible to infection *byToxoplasma gondii*, fatal acute cases presenting with development of necrotic lesions and strong inflammatory response. The aim of this study was to describe the distribution of lesions present and to identify tachyzoites in New World monkeys and prosimians kept in captivity, which apparently died of acute toxoplasmosis.

Methods: We recovered pathological material from five squirrel monkeys, one howler monkey and two lemurs, which apparently died of acute toxoplasmosis. Re-evaluation of the samples was performed by histopathology in order to confirm the presence of parasites and to determine lesions distribution. Immunohistochemistry (IHC) using goat antiserum as primary antibody source and revealing with a anti-goat IgG-peroxidase conjugate was the first technique used. The cases were also confirmed by *B1* and *SAG3* genes amplification by PCR.

Results: Main lesions in all animals tested were: pulmonary edema, interstitial pneumonia, hepatitis, necrotic splenitis and lymphadenitis with parasites within and out the lesions, consistent with acute infection. In one squirrel monkey necrotic enteritis and presence of parasites were also observed. In lemurs injuries were more serious in the liver parenchyma, presenting abundant parasites. Parasitic structures (tachyzoites and extracellular free-forms) were strongly positive by IHC in all tissues tested (figure). With this technique we were able to detect tachyzoites in the renal glomeruli and tissue cysts in the myocardium and central nervous system, without the presence of inflammatory cell infiltration or necrosis. PCR results supported diagnosis of *T. gondii* infection.



Microscopic findings. A necrotic zone (arrow). can be seen in the liver (A). In B parasites positive to immunostaining can be observed free (arrows) or in clusters (circle). Tachyzoites were present in the renal glomeruli of some animals (C).

Conclusion: The injuries present in the lungs, liver, spleen and lymph nodes are compatible with acute toxoplasmosis, as it has been described in the literature for these species. Nevertheless, a wider distribution of parasites could be detected by IHC, even in renal glomeruli; also, tissue cysts were suggested in other organs, which might imply that a primary, chronic infection was followed much later by a second, due to a more aggressive strain/challenge size, which leaded animals to death. These species could be less susceptible to *T. gondii* than thought.

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